VZ-LINK
MAGAZINE

NEW ZEALAND

VZ 300/200
COMPUTER USERS CLUB

ISSUE 38 DECEMBER 89

MERRY CHRISTMAS

FROM ME TO YOU

CHRISTMAS MESSAGE

It is once again that time of year when all our energy is directed at Bar-B-Ques,Holidays and Celebrating Christmas with family and friends.

So I would like to take this oppourtunity to wish each and everyone of you,a MERRY CHRISTMAS and all the best for the coming new year.
I hope that over the holiday period everyone enjoys a well earned rest and is able to brush the dust of their VZ's.

Enjoy yourselves but watch the drinking and driving as this club,YOUR CLUB,looks forward to sharing next year's activities with you.

I will be available over christmas,so if anyone has any problems,please feel free to contact me.

A WARNING

It would appear that Dick Smith Electronics is getting a little (understatement) slack when it come's to Repairs.

Peter Maxwell has had all sorts of problems just getting a Datasette repaired.
It seems that D.S.E will still do repair's ,But when you try to get the thing back the fun begins.

The only comment I can make is "it is bloody poor".
You just should not have to keep on at them.!!!

NEXT YEAR

I hope to have heaps of activities planned for next year.
I would like to have some Great Competitions,More Tutorials etc.
I am a little unsure about the club meetings continuing.
The numbers attending seems to get less each time.
I am not sure why ?.

In the next issue,January I will try to include a Questionaire, so I can see what you,the members want .
That way,I can plot out where the club should be heading.Also I will be able to give the members what they want,(I hope).

THIS ISSUE

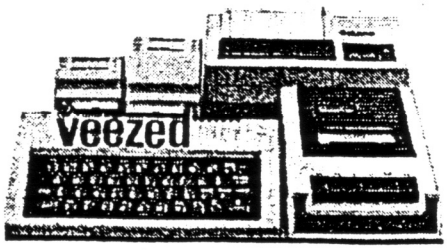
We have the program from Steve Dale as promised.
We also continue the Micro Magic series.
This is a Very long series and is,I feel a true" Beginners Guide to the VZ "and computing in basic.

I do hope it doesn't bore the more experienced users.Again your comments would be great.

Also another fine item on DISK DRIVE Maintenance.
Reprinted with the Permission of Mark Harwood,from his VZ USER newsletter.

ONCE AGAIN MERRY CHRISTMAS AND HAPPY VZING TO YOU ALL

MICRO MAGIC



Beginner's Guide to the Veezed ~

MICRO TYPE

MICRO TYPE is a BASIC Word Processor written for the VeeZeds 200 and 300. As presented here it is suitable for use with a Dick Smith X-3250 Graphic Printer, otherwise known as a GP-100. In this issue of MICRO MAGIC we give instructions on how to adapt the program for use with other Centronics-type printers, and for use with the Dick Smith PP40 Printer Plotter and the TOYO TP-40 Printer Plotter. Please read the operating instructions before entering the program so you can understand the commands.

MICRO TYPE Instructions

CRUN

- Select ENTER or RETRIEVE
- ENTER is for entering text.
- RETRIEVE is for loading text from tape.

ENTERING TEXT.

- A TYPING GUIDE will appear with a flashing curser against the first place of the first line of text to be typed. Using INVERSE for Capital letters, Commas, Colons and Semi-colons type a message. Check for correctness and hit RETURN to access the MENU. To move the curser along the line of text use CTRL and either the left or right facing ARROWS. The curser does not need to be at the end of the line of text when you hit RETURN.

MENU.

- The MENU appears after each line of text. The INVERSE capital letter of the options are the letters to press to select the options. To CONTINUE typing hit C and the next line becomes available with the previous line printed below as an aid to composing.

INDENT.

- Indent means starting a line a few spaces in from the left-hand margin. Often used in the first line of a paragraph. To INDENT type a SHIFTZ graphic into first place of a line and then SPACE to where you want the sentence to begin. The SHIFTZ graphic is a non-printing character.

SCROLL.

- To review all that you have typed, from the MENU select S (for SCROLL) and your text will be printed line-by-line preceded by the line number. Make a note of the number of any line needing correction.

EDIT.

- From the MENU select E (for EDIT) and enter the number of the line requiring correction. The line will appear on the screen with TYPING GUIDES and the word DELETE. You are required to type the word or words to be Deleted. After pressing the RETURN the word(s) to be deleted will be erased and the word changed to ENTER. Type in the word(s) that are to take the place of those being deleted. On pressing RETURN the line will be amended on-screen. It is important that the word(s) to be deleted are EXACTLY the same as was originally typed. The computer will not recognise any variation.

PRINT

- From the MENU select P for PRINT and your text will be printed on your Printer.

FILE

- Set up a cassette for recording. Select F for FILE and start tape on RECORD. Each line will be printed as it is recorded. Keep a note of the number of lines for future retrieval.

RETRIEVE

- Set up cassette ready to PLAY. Select R for RETRIEVE either from the initial option after CRUN or from the Menu. Then ENTER the number of lines to be retrieved. Enter RETURN and when WAITING appears start the tape. As each line is retrieved it will be printed on the screen.

BREAK

- A useful feature is that you can BREAK the program without losing your text, providing you do not use LLIST or LIST. If, for instance, you had forgotten how many lines there were to be retrieved. Enter a larger number than is likely. Begin to RETRIEVE. When the last line appears on the screen, stop the tape, BREAK the program and type GOTO230<RETURN> and the Menu will appear. The number of lines will be the number that you used. By using SCROLL you can determine how many lines there really is. Again, BREAK the program and type L=25:GOTO230<RETURN> (L being the actual number of lines) and the Menu will return and the number of lines will be correct.
- Also, if you wanted to DELETE a complete line, instead of using EDIT and re-typing the complete line to be DELETED, you could BREAK and if, say, you wanted to DELETE the whole of line 25, type Z$(25)="■":GOTO230<RETURN> making the charcter inside the quotes a SHIFTZ Graphic. Then when the Menu reappears you only need to EDIT line 25. It is important to remember that no String Variable should ever be left empty. That is why we made Z$(25) a non-printing graphic, so that it can be EDITed if need be.

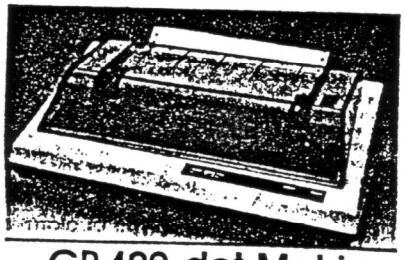
AUTO

- If you want to use AUTOmatic Line Numbering here it is:-

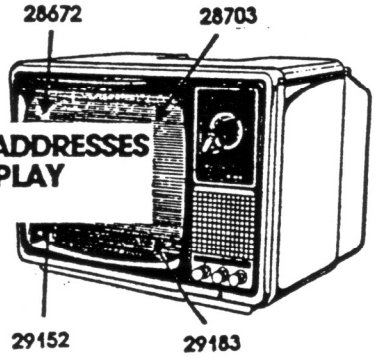
```
0 REM100,10
1 POKE31469,183:RUN
```

Note that RUN is part of line 1.
ENTER **RUN** and line number 100 will appear.

Pages 1 to 4 were prepared using a Dick Smith GP-100 Printer. This printer simulates the Graphics and Inverse characters of VeeZed computers. The rest of MICRO MAGIC was prepared on a STAR SG-10 Printer that does not print VeeZed Graphics or the Inverse characters. The advantages and disadvantages of these printers will be discussed after the MICRO TYPE program. How to adapt this program to suit different printers and plotters will also be given.



GP-100 dot Matrix Printer



DECIMAL POKE ADDRESSES FOR VZ-200 DISPLAY CORNERS

*** M I C R O T Y P E ***

■ Be preapared to CSAVE as you proceed. ■

```
100 CLS:CLEAR10000:DIMZ$(100)
```

Clear the screen. CLEAR 10000 will clear 10,000 memory locations while DIMZ$(100) will allow Z$(0) to Z$(100) to be used as String Variables for storing text.
■ If your VeeZed is unexpanded then use the following:-
100 CLS:CLEAR2000:DIMZ$(60)
It is recommended that you limit your lines of text to 50, keeping the extra 10 in reserve for finishing sentences.

```
110 POKE30744,0:PRINT@230,"■MICRO■TYPE■":SOUND16,8:L=1:COLOR,1
```

After printing the title with a SHIFTJ at either end of the INVERSE letters of MICRO TYPE, put in a SOUND to act as a small delay before going on to the next line.
L=1 is the number of the first line of text.
The COLOR presents a light buff background which provides a better contrast than green for reading the text on screen.

```
120 PRINT@299,"E■NTER OR R■ETRIEVE"
```

This provides the option of using the program for Entering text by typing or Retrieving the text from tape.

```
130 A$=INKEY$:A$=""
140 A$=INKEY$:IFA$=""THEN140
150 IFA$="R"THEN720
160 IFA$<>"E"THEN140
170 CLS:PRINT@2,"L■INE"L
```

INKEY$ is the command that instructs the computer to scan the keyboard and return any key that has been pressed.
A$ records which key (if any) that was pressed.
Line 130 makes A$ = INKEY$, then sets A$ to "nothing".
Line 140 repeats A$=INKEY$ and if no key has been pressed the computer stays at this line until a key IS pressed.
Line 150 sends the program to line 720 if R is pressed.
If R was not pressed and the program goes on to line 160 then line 160 will send the computer back to 140 if E has not been pressed. This means that if any key other than R or E is pressed then the program will go back and continue checking until either R or E is pressed.
Line 170 after clearing the screen prints LINE followed by the value of L, which at present is 1.

```
180 PRINT@32,"  ■■■
```

MENU

```
230 CLS:A$=INKEY$:A$=""
240 PRINT@40,"[illegible]";L:PRINT@104,"SCROLL"
250 PRINT@116,"EDIT":PRINT@168,"PRINT"
260 PRINT@232,"FILE":PRINT@296,"RETRIEVE":PRINT@360,"CONTINUE"
270 PRINT@421,"[illegible]";X:SOUND18,1
```

Clear the screen and set A$ to record the INKEY$ scan of the screen. Make sure that A$ is empty.
Lines 240 to 270 sets out the MENU on the screen. L is the TOTAL LINES used. X will be the LAST LINE EDITED. The INVERSE capital letters of each of the options is the key to be pressed to access that option.

```
280 A$=INKEY$:A$=""
290 A$=INKEY$:IFA$=""THEN290
300 IFA$="S"THEN770
310 IFA$="E"THEN460
320 IFA$="P"THEN370
330 IFA$="F"THEN670
340 IFA$="R"THEN720
350 IFA$="C"THENL=L+1:GOTO170
360 IFA$<>"C"THEN290
```

As before we are using A$ to record the keyboard scan by INKEY$.
Note that in line 350, because this will produce the TYPING GUIDES and INPUT for another line of text, L is increased by 1 to change the line number and to also change the String Variable to Z$(2).
Line 360 sends the program back to 290 should any other key be pressed.

■ You can now RUN the program to see the Menu. Of course, you cannot select an option from the Menu as the subroutines have not yet been entered. If you are using AUTO then use RUN100, and to get back to programming just use RUN. You will see that line 0 appears blank. This is because the TOKEN for AUTO has no character equivalent.

ASCII CODE CONVERSION

All characters are held in computer memory as numbers; a code of numbers known as the ASCII CODE. Printers also have all its characters stored in memory. But, while printers usually use a standard code, some computers do not. Your VeeZed holds some standard ASCII Code numbers in memory but many numbers do not conform. For instance, if you type PRINTCHR$(109) a HYPHEN is printed on the screen, but if you type LPRINTCHR$(109) a lower case m is printed on the printer. Fortunately, the computer's non-standard ASCII Code numbers fall into consecutive blocks. All the VeeZed's INVERSE letters are between ASCII numbers 192 and 223, so if we want to change an INVERSE letter to an UPPER case letter, we simply subtract 128 from every ASCII number in that block. This means that for every INVERSE letter you type an UPPER case character will be LPRINTed instead of an INVERSE letter. If we do the same to the block of normal characters to LPRINT LOWER case characters then we have the basis for a word processor. The first RULE is that your CAPITAL letters must be typed in INVERSE, while normal characters will be LOWER case.

Because your VeeZed turns COMMAS, COLONS and SEMI-COLONS into COMMANDS, they must also be entered in INVERSE, so that they too can have their ASCII numbers changed. If you type a normal COMMA in your text,the computer will print EXTRA IGNORED and the COMMA and all after will be lost. When this happens you're able to repair the damage using the EDIT facility. ANNOYING!!!

NEXT ISSUE
THE SUB-ROUTINES

DISK DRIVE MAINTENANCE

For many Vz users, the most expensive part of their computer set-up was the disk drive and disk controller. It so happens that this particular peripheral requires the most love and care, and so this month we're looking at how to look after your disk system. We'll also look at aligning the drive, for those that can afford it!

Let me start out by saying that unlike many other disk drive units, the VZ drive is not a high precision device. Sure, reasonably accurate alignment is necessary, but all adjustments are within reach of the average hobbiest (if he/she can afford the alignment disk!). However, for the vast majority, preventative maintainance is all that's required to keep a drive up and running. More serious problems usually reveal themselves from the very first time the drive is used, and can be handled by waranty, or the supplier.

Preventative maintainance includes both the insides of the drive, as well as care of the disks themselves. Most people realise the importance of keeping unused disks in their jackets, to avoid dust build up on the disk surface, or accidental spills etc. However, many forget that most loss of disk information is due to effects unseen; magnetic effects causing the magnetic alignment of particles on the disk to be disrupted, and hence the corruption of the disk. Some typical areas of danger are:

1. Leaving disks on top of electrical equipment, such as monitors, printers, or the computer itself. Many of these have weak magnetic fields around them and so can ruin a disk.

2. Leaving disks on or very near power cables can have a similar result.

3. Paper clips and other metallic odds and ends can easily become magnetised. Don't let them get near your disks!

Most of the above disasters can be avoided by storing your disks in some kind of disk box, which is kept clear of all of the above.

Care needs to .be taken when the disks are being used in the drive. Always push the disk right into the drive before closing the 'door'. This will ensure that there is minimum wear on the hub of the disk. Disks with re-enforced hub rings are a good idea. Whenever reseting the computer, open the 'door' first, or better still, remove the disk completely. VZ300s have a tendency to start the drive spinning when they are switched off. This has been known to erase the directory track of the disk, and render it useless! If you have a VZ300, ALWAYS open the 'door' on the drive before switching off.

Now comes the drive itself. The main concern here is the read/write head. This can become coated with particles of iron oxide, just like a cassette deck's head does. Although a dirty head can cause occasional errors, it's best to check it visually on a regular basis. Remove the outer set of screws from the base of the disk drive, and lift off the top cover. Along the centre axis of the unit you will see the hub assembly. Behind it is a small pressure pad which sits on the disk surface directly above the head. This is carefully lifted to gain access to the head surface. If the head appears discoloured wipe it with a cotton bud soaked in pure alcohol or head cleaning fluid. When this has evaporated, wipe carefully with clean cloth, being careful not to leave any fluff or the like on or around the surface. Leave the pressure pad lifted until this process is completed.

Alternatively, a head cleaning disk (if obtainable!) can be used. Simply insert this as you would any disk, and using the Disk Control Program in the DSE Technical Manual (SEE IMPORTANT NOTES AT THE END OF THIS ARTICLE) move the head from track#00 to track#39 and back several times.

The above should cover the vast majority of maintainance on VZ disk drives. However, there are a minority of problems not attributable to a dirty head. These result from one or a combination of the following possibilities:

1. Disk Drive rotation speed.
2. Disk head alignment error.
3. Hub-centering mechanism failure.
4. Disk drive component failure.
5. Disk controller component failure.

We'll look at each of these in turn:

ROTATION SPEED

In some of the drives I've seen recently, this has been a problem. To test it, you'll need an alignment disk and a frequency counter. Unless you can borrow someones alignment disk (which isn't very likely since they're uncopiable and so valuable!) you'll have to fork out around $120 for one! No doubt this price is prohibitive for most. The only copy I know of is one owned by Gavin Williamson of Laserlink in Newcastle NSW, so he might be the person to contact for these alignment problems (he probably wont forgive me for that!). Follow the instructions given in the Technical Manual, but note the changes that must be made to the disk control program, listed at the end of this article.

HEAD ALIGNMENT

Once again, the Technical Manual has instructions for this process. However, in practice, the CRO patterns shown at the bottom of page 15 are unreadable with the specified sweep speed unless you've got a storage CRO! We found a better test was to move to track #0 and adjust the head alignment until the signal level is at a maximum, which corresponds to the head being centred over the track. This proved to be more than accurate enough for the drives tested.

HUB-CENTERING MECHANISM

This showed up as a subtle problem in the VZ drive. Symptoms include constant track#0 reseting whenever a DIR is executed, which is cured by opening and shuting the 'door'. The problem is caused by insufficient pressure being exerted on the hub of the disk to centre it. Try carefully moving a disk to one side in its jacket, by placing your finger through the centre of the disk and drawing it in one direction, so that it is clearly off-centre. Now insert it in the drive and close the 'door'. Open it and remove the disk. If there is a problem, the disk will still look off-centre. Open up the drive as described above, and observe the operation of closing the 'door'. You will notice a small piece of spring steel which regulates the amount of movement in the hub assembly when it is lowered. To gain access, you will have to carefully remove the hub itself. Bend the steel so as to increase hub movement, and replace the hub. Try the above test again. The disk should be centred whenever the 'door' is closed.

DRIVE/CONTROLLER COMPONENT FAILURE

This is detected usually by the fact that some fault occurs constantly. Although many such problems should be left to a repair technician, here are some faults I've come across:

- Write Protect message displayed when disk is not write protected. Fault: Hex inverter 74LS14 (U3) failed (only one gate failed!).
- Failure to select correct drive. Fault: 74LS00 (U9) in disk controller.

Note that these are faults I've come across - the same symptoms could result from different faults. I hope that these notes will be of some use in keeping your drive in order.

ATTENTION - ERRORS IN TECHNICAL MANUAL DISK CONTROL PROG.

The disk control program on pages 17-19 has a couple of errors in it. Note that the drive under test must be in DRIVE 2 slot on the controller!

Line 400: 400 GOTO 250
Line 1020: 1020 GOSUB 700

P.O.BOX 1972 C.P.O AUCKLAND N.Z

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YOU ARE WELCOME TO PHONE ME IF YOU HAVE PROBLEMS
PHONE 761-451

MORSE TUTOR

```
10 'MORSE LEARNING PROGRAM
11 'COPYWRITE STEVE DALE
12 'ZL2BKA, 1987
20 CLEAR 500
30 CLS:PRINT:PRINT:PRINT"        (INVERSE COLOUR)THE MORSE CODE"
40 PRINT"THIS PROGRAM IS TO HELP YOU TO"
50 PRINT"LEARN THE MORSE CODE."
60 PRINT"AS EACH LETTER COMES UP, NOT "
70 PRINT"ONLY WILL YOU HEAR IT, YOU WILL"
80 PRINT"ALSO SEE IT ON THE SCREEN."
85 PRINT"THE FIRST LETTERS YOU WILL"
86 PRINT"LEARN WILL BE E,I,S,H,T,M, AND"
90 PRINT"O.  HIT<RETURN> TO START..."
95 INPUTT$:CLS
105 GOTO150
110 PRINT"▄ ";:SOUND30,1:RETURN
112 PRINT"▄▄▄▄ ";:SOUND30,4:RETURN (GRAPHICS: CTRL+'J')
120 FORJ=1TO10
130 GOSUB2000:GOSUB2000
135 GOSUB3000
140 PRINT@360,"                        ":NEXTJ:RETURN
150 O$="E":C$="E":GOSUB600
160 O$="I":C$="I":GOSUB600
170 O$="S":C$="S":GOSUB600
180 TO 390(STEP 10)AND 395 HAVE THE SAME FORMAT WITH THE
    LETTERS IN THIS ORDER: S,H,T,M,O,Z,K,U,N,W,L,B,X,Y,A,D,F,V,
    P,J,Q,G,,C, AND R.   THE VALUE OF O$ IS PRINTED IN INVERSE.
500 CLS:PRINT:PRINT"  OK, YOU HAVE GONE THROUGH"
502 PRINT" THE ENTIRE ALPHABET NOW. "
505 PRINT" YOU SHOULD NOW GO BACK OVER "
506 PRINT" THE PROGRAM YOU HAVE JUST"
507 PRINT" FINISHED, AND RELEARN THE "
508 PRINT" LETTERS YOU ARE NOT TOO SURE"
509 PRINT" ABOUT.   ARE THERE ANY YOU"
510 PRINT" WANT TO REVIEW";:INPUTT$
511 IFT$="N"THEN900
512 PRINT"OK, WHICH ONE DO YOU WANT TO"
513 PRINT"REVIEW";:INPUTC$
515 GOSUB3000
516 PRINT"OK, AGAIN";:INPUTT$:IFT$="Y"THEN512ELSE900
600 GOSUB1000
610 PRINT:PRINT"                    "O$:GOSUB1120:CLS
615 GOSUB1200:RETURN
900 CLS:PRINT:PRINT"OK, NOW WE WILL GO ON TO THE"
901 PRINT"NUMBERS.  THESE ARE QUITE A"
902 PRINT"LOT EASIER TO LEARN THAN THE"
903 PRINT"LETTERS, BECAUSE THEY ARE ALL"
904 PRINT"IN ORDER.   SO LETS BEGIN."
905 PRINT"HIT <RETURN> TO BEGIN THE"
906 PRINT"NUMBERS....":INPUTT$
910 GOTO5000
1000 CLS:PRINT:PRINT" WE WILL NOW LEARN THE LETTER":X=X+1:RETURN
1100 'FIGURE WIPE
1110 PRINT@360,"            ":RETURN
1200 IFX<7THENRETURNELSEPRINT:PRINT"(INVERSE)          TEST"
1207 SOUND10,3:SOUND30,3:PRINT"OK: NAME THE FOLLOWING LETTERS:"
1210 FORK=1TO15
1260 S=RND(X)
1265 IFS=1THENC$="E"
1266 IFS=2THENC$="I"
1267 IFS=3THENC$="S"
1268 IFS=4THENC$="H"
1269 IFS=5THENC$="T"
```

```
1270 IFS=6THENC$="M"
1271 IFS=7THENC$="O"
1272 IFS=8THENC$="Z"
1273 IFS=9THENC$="K"
1274 IFS=10THENC$="U"
1275 IFS=11THENC$="N"
1276 IFS=12THENC$="W"
1277 IFS=13THENC$="L"
1278 IFS=14THENC$="B"
1279 IFS=15THENC$="X"
1280 IFS=16THENC$="Y"
1281 IFS=17THENC$="A"
1282 IFS=18THENC$="D"
1283 IFS=19THENC$="F"
1284 IFS=20THENC$="V"
1285 IFS=21THENC$="P"
1286 IFS=22THENC$="J"
1287 IFS=23THENC$="Q"
1288 IFS=24THENC$="G"
1289 IFS=25THENC$="C"
1290 IFS=26THENC$="R"
1365 GOSUB3000
1370 GOSUB1500:IFG$<>C$THEN1380
1371 PRINT@390,G$" IS CORRECT!":SOUND20,1:SOUND25,3
1375 G=G+1:GOSUB1390:NEXTK:GOTO1400
1380 PRINT@390,G$;" IS WRONG":SOUND10,3:H=H+1:GOSUB1390:GOTO1280
1390 PRINT@360,"                          "
1395 PRINT@390,"                        ":RETURN
1400 :CLS:PRINT:PRINT"  (INVERSE) SCORE:"
1410 PRINT:PRINT"YOU GOT";G-H;"AVERAGE FIRST GO"
1415 IFG-H>7THENPRINT"NOT BAD!"
1420 PRINT"DO YOU WANT TO TRY":RESTORE:G=0:H=0
1430 PRINT"THIS TEST AGAIN";:INPUTT$:IFT$="Y"THENX=X-1:GOTO1207
1431 RETURN
1500 L$=INKEY$
1510 G$=INKEY$:IFG$=""THEN1510
1520 RETURN
2000 FORI=1TO500:NEXTI:RETURN
2100 'SHORT PAUSE
2110 FORI=1TO500:NEXTI:RETURN
3000 'SETUP
3005 PRINT@360," ";
3010 IFC$="A"THENGOSUB110:GOSUB112
3020 IFC$="B"THENGOSUB112:GOSUB110:GOSUB110:GOSUB110
3030 IFC$="C"THENGOSUB112:GOSUB110:GOSUB112:GOSUB110
3040 IFC$="D"THENGOSUB112:GOSUB110:GOSUB110
3050 IFC$="E"THENGOSUB110
3060 IFC$="F"THENGOSUB110:GOSUB110:GOSUB112:GOSUB110
3070 IFC$="G"THENGOSUB112:GOSUB112:GOSUB110
3080 IFC$="H"THENGOSUB110:GOSUB110:GOSUB110:GOSUB110
3090 IFC$="I"THENGOSUB110:GOSUB110
3100 IFC$="J"THENGOSUB110:GOSUB112:GOSUB112:GOSUB112
3110 IFC$="K"THENGOSUB112:GOSUB110:GOSUB112
3120 IFC$="L"THENGOSUB110:GOSUB112:GOSUB110:GOSUB110
3130 IFC$="M"THENGOSUB112:GOSUB112
3140 IFC$="N"THENGOSUB112:GOSUB110
3150 IFC$="O"THENGOSUB112:GOSUB112:GOSUB112
3160 IFC$="P"THENGOSUB110:GOSUB112:GOSUB112:GOSUB110
3170 IFC$="Q"THENGOSUB112:GOSUB112:GOSUB110:GOSUB112
```

```
3180 IFC$="R"THENGOSUB110:GOSUB112:GOSUB110
3190 IFC$="S"THENGOSUB110:GOSUB110:GOSUB110
3200 IFC$="T"THENGOSUB112
3210 IFC$="U"THENGOSUB110:GOSUB110:GOSUB112
3220 IFC$="V"THENGOSUB110:GOSUB110:GOSUB110:GOSUB112
3230 IFC$="W"THENGOSUB110:GOSUB112:GOSUB112
3240 IFC$="X"THENGOSUB112:GOSUB110:GOSUB110:GOSUB112
3250 IFC$="Y"THENGOSUB112:GOSUB110:GOSUB112:GOSUB112
3260 IFC$="Z"THENGOSUB112:GOSUB112:GOSUB110:GOSUB110
3270 RETURN
5000 GOTO5600
5005 CLS:PRINT:PRINT" WE WILL NOW LEARN THE NUMBER":RETURN
5010 PRINT@356," ";
5015 IFJ=1THENGOSUB110:GOSUB112:GOSUB112:GOSUB112:GOSUB112
5020 IFJ=2THENGOSUB110:GOSUB110:GOSUB112:GOSUB112:GOSUB112
5030 IFJ=3THENGOSUB110:GOSUB110:GOSUB110:GOSUB112:GOSUB112
5040 IFJ=4THENGOSUB110:GOSUB110:GOSUB110:GOSUB110:GOSUB112
5050 IFJ=5THENGOSUB110:GOSUB110:GOSUB110:GOSUB110:GOSUB110
5060 IFJ=6THENGOSUB112:GOSUB110:GOSUB110:GOSUB110:GOSUB110
5070 IFJ=7THENGOSUB112:GOSUB112:GOSUB110:GOSUB110:GOSUB110
5080 IFJ=8THENGOSUB112:GOSUB112:GOSUB112:GOSUB110:GOSUB110
5090 IFJ=9THENGOSUB112:GOSUB112:GOSUB112:GOSUB112:GOSUB110
5100 IFJ=0THENGOSUB112:GOSUB112:GOSUB112:GOSUB112:GOSUB112
5105 RETURN
5110 PRINT@356,"                                "
5120 PRINT@384,"                        ":RETURN
5200 CLS:PRINT:PRINT"    (INVERSE) TEST"
5207 SOUND10,3:SOUND30,3:PRINT"OK: NAME THE FOLLOWING NUMBERS:"
5210 FORK=1TO15:J=RND(9):G$=STR$(J):GOSUB5010
5260 GOSUB1500:G=VAL(G$):IFG=JTHENGOTO5300
5270 IFG<>JTHENPRINT@390,G"IS WRONG!    ":SOUND10,3
5275 GOSUB5110:GOSUB5010:GOTO5260
5280 SOUND15,1:SOUND20,3:GOSUB5110:NEXTK:GOTO5700
5300 PRINT@390,G;"IS CORRECT!":GOTO5280
5600 FORJ=0TO9
5610 GOSUB2000
5621 GOSUB5005:PRINT:PRINT"              "J
5625 FORL=1TO10:GOSUB5010:GOSUB5110:GOSUB2000
5627 NEXT L
5630 PRINT@360,"                        ":NEXTJ:GOSUB5200
5700 CLS:PRINT"  WELL, THAT'S THE LOT!"
5710 PRINT"YOU HAVE NOW GONE THROUGH THE"
5720 PRINT"WHOLE ALPHABET AND NUMBERS."
5730 PRINT"IF YOU FEEL YOU NEED MORE "
5740 PRINT"PRACTICE WITH SOME LETTERS"
5750 PRINT"THEN PLAY THE PROGRAM AGAIN."
5751 PRINT"OR YOU MIGHT LIKE TO TUNE IN A"
5752 PRINT"RADIO RECEIVER AND LISTEN TO"
5753 PRINT"THE RADIO AMATEUR BANDS"
5754 PRINT"SEE IF YOU CAN UNDERSTAND THE"
5755 PRINT"MORSE ON THEM."
5760 PRINT"HIT <<A>> TO START AGAIN."
5770 PRINT"IF YOU WOULD RATHER DO SO AT A"
5780 PRINT"LATER DATE, HIT <<S>> AND THE"
5790 PRINT"PROGRAM WILL CEASE..."
5800 GOSUB1500:IFG$="A"THENCLS:RUN
5810 IFG$="S"THENCLS:END
```

STANDARD MICROSOFT / MACHINE	DATA	DEF	DELETE	DIM	EDIT	END	EXP	FOR	FRE	GET	GOSUB
	Lists data to be used in a READ statement.	Define arithmetic string function.	Delete specified program lines.	Allocates space for arrays specifies max subscript values.	Edit a program line.	Stop program & return to BASIC.	Raises to power of expression.	Used with NEXT to repeat a sequence of lines.	Returns remaining memory space.	Read a record from disk or tape	Branch to a Basic subroutine.
	DATA const [,const . . .]	DEF FNvar [(var,var . . .)] =exp	DELETE lineno [,lineno]	DIM var(sub), [,var(sub), . . .]	EDIT lineno	END	EXP(exp)	FOR var = exp TO exp [STEP exp]	FRE(exp)	file GET [#] fileno [,record no]	GOSUB lineno
APPLESOFT	DATA CONST [,const . . .]	DEF FNvar (var) = exp	DEL lineno, lineno	DIM var(sub) [,var(sub) . . .]	[screen editing using CTRL keys]	END	EXP(exp)	FOR var = exp TO exp	FRE(exp)Note: exp is a dummy variable	INPUT var [,var . . .] NB: Get var(s) from current input device	GOSUB lineno/ var/exp
ATARI	DATA const [,const . . .]			DIM [or COM] var (sub) [,var (sub) . . .] NB:dim'sion ALL strings	[cursor editing]	END	EXP(exp)	FOR var = exp TO exp [STEP exp]	FRE(exp) Note: exp is a dummy variable	GET # fileno, record	GOSUB lineno/ var/exp
BBC MICRO	DATA const [,const . . .]	DEF FNvar [(var. var)] = exp	DELETE lineno. lineno	DIM Var(sub) [,var(sub) . . .]	[cursor editing]	END	EXP(exp)	FOR var = exp TO exp [STEP exp]	HIMEM-TOP	INPUT # fileno. record [,record . . .]	GOSUB lineno/ var/exp
COMMODORE 64	DATA const [,const . . .]	DEF FNvar =exp		DIM var(sub) [,var(sub) . . .]	[cursor editing]	END	EXP(exp)	FOR var = exp TO exp [STEP exp]	FRE(exp) Note: exp is a dummy variable	GET #fileno, record [,record . . .]	GOSUB lineno
MICROBEE	DATA expr (,exp ("exp"))	FNn = exp	DELETE lineno. (lineno.)	DIM var(sub) (,var(sub))	EDIT (lineno.)	END	EXP (real=exp)	FOR var=exp TO exp (STEP exp)	FRE(0) mem. space FRE(S) str. space		GOSUB NB: sq. br. significant
PET	DATA const [,const . . .]	DEF FNvar (var) = exp)		DIM var(sub) [,var(sub) . . .)	[cursor editing]	END	EXP(exp)	FOR var = exp TO exp [STEP exp]	FRE(exp) [TRS-80] is a dummy variable	INPUT # fileno. record [,record . . .]	GOSUB lineno
TRS-80/SYSTEM 80	DATA const [,const]	Various DEF statements available but none equivalent	DELETE lineno-lineno	DIM var(sub) [,var(sub) . . .]	EDIT lineno	END	EXP(exp)	FOR var = exp TO exp [STEP exp]	FRE(exp) [TRS-80] or MEM [System 80]	INPUT # fileno. record [,record . . .]	GOSUB lineno
VIC-20	DATA const [,const . . .]	DEF FN(var) =exp		DIM var(sub) [,var(sub) . . .]	[cursor editing]	END	EXP(exp)	FOR var = exp TO exp [STEP exp]	FRE(exp) Note: exp is a dummy variable	GET # fileno, record	GOSUB lineno
VZ200	DATA const [,const . . .]			DIM var(sub) [,var(sub) . . .]		END	EXP(exp)	FOR var=exp TO exp [STEP exp]		INPUT # filename var[,var . . .] NB: Gets record from tape	GOSUB lineno
ZX81				DIM var(sub)	EDIT Note: use cursor to select line		EXP(exp)	FOR var = exp TO exp [STEP exp]			GOSUB LINENO var/exp
ZX SPECTRUM	DATA const [,const . . .]	DEF FNvar [(var.var . . .)] = exp		DIM var(sub)	EDIT (lineno) Note: cursor line by default		EXP(exp)	FOR var = exp TO exp [STEP exp]		Consult Microdrive manual	GOSUB lineno/ var/exp